



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/674,697	09/30/2003	Robert K. Barr	51384	4570

21874 7590 06/07/2005

EDWARDS & ANGELL, LLP
P.O. BOX 55874
BOSTON, MA 02205

EXAMINER

ASHTON, ROSEMARY E

ART UNIT	PAPER NUMBER
----------	--------------

1752

DATE MAILED: 06/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/674,697

Applicant(s)

BARR ET AL.

Examiner

Rosemary E. Ashton

Art Unit

1752

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 8, 9, 12-14 and 17 is/are rejected.
- 7) ☒ Claim(s) 6, 7, 10, 11, 15 and 16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 1-19-05.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

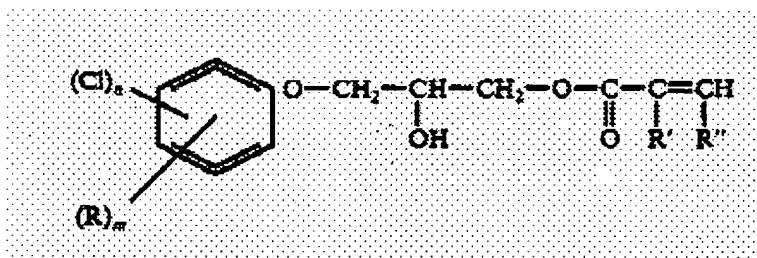
A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1,3 are rejected under 35 U.S.C. 102(b) as being anticipated by Pastor et al. patent no. 4,052,527.

In col. 3, lines 35-46, Pastor teaches the non-acid functional monomeric photoinitiator (PI) below.



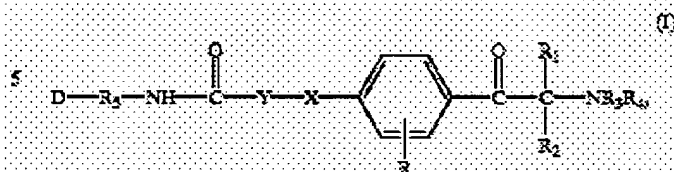
3. Claims 1,3,4,5,8,9 are rejected under 35 U.S.C. 102(b) as being anticipated by Chabreck et al. patent no. 6,204,306.

Art Unit: 1752

In col. 1, lines 5-20 and col. 2 Chabreck teaches the formula below.

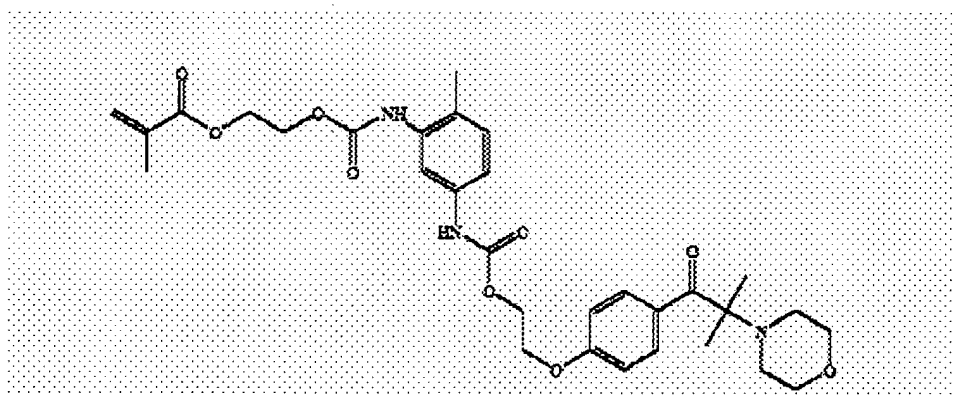
The present invention relates to α -aminoacetophenones functionalised with organic diisocyanates, which can be used as reactive photoinitiators; to oligomers and polymers to which such functionalised α -aminoacetophenones are bonded; to α -aminoacetophenones having an unsaturated polymerisable side-chain; to dimeric and trimeric photoinitiators; to the use of such photoinitiators; to materials coated with such photoinitiators; and to the use of the functionalised α -aminoacetophenones for modifying surfaces.

The invention relates to compounds of formula (I)



A non-acid functional compound of the aminoacetophenone is shown below.

The compound has urethane (NHCO₂) groups as in claim 4.



Column 24, lines 35-40, below states the photoinitiators may be used in photoresist compositions as shown below.

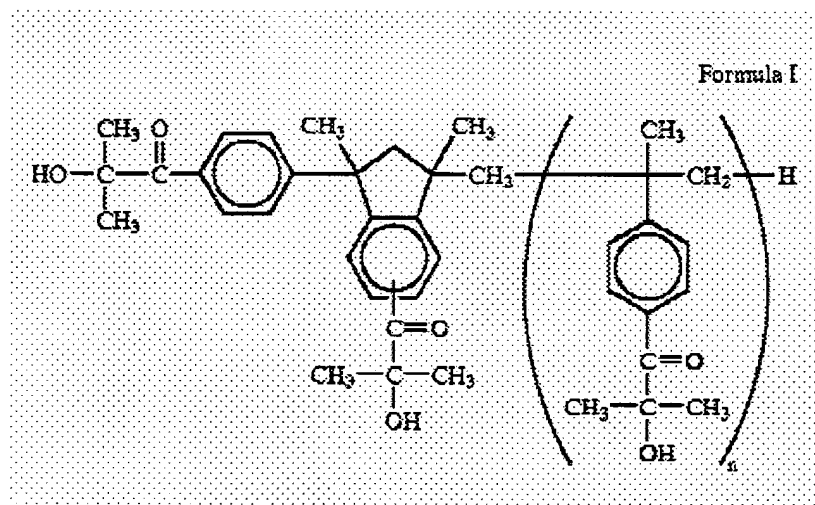
Art Unit: 1752

35 Another important field of application comprises coating compositions, which may be pigmented or unpigmented. The mixtures are especially useful in white paints, by which TiO_2 -pigmented coating compositions are understood. Other fields of application are radiation-curing of photoresists, the
 40 photo-crosslinking of silver-free films and the production of printing plates. Another use is for outdoor paints the surface of which subsequently cures in daylight.

4. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Visconti et al publication no. US 2004/0116549 A1.

Visconti teaches oligomeric PIs having an alpha-hydroxycarbonyl group as shown below.

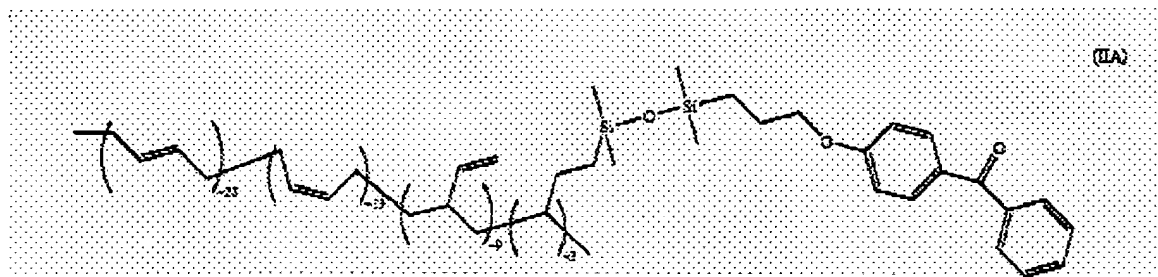
[0001] The present invention refers to solid mixtures of alpha-hydroxycarbonyl derivatives of alpha-methylstyrene oligomers and to their use as photoinitiators in light-induced radical photopolymerisation of acrylic systems.



5. Claims 1,3,5 are rejected under 35 U.S.C. 102(e) as being anticipated by Herr et al publication no. US 2003/0236425 A1.

Art Unit: 1752

Herr teaches polymeric PIs having a benzophenone group as shown below. The PI is non-acidic.



6. Claims 1,3,5 are rejected under 35 U.S.C. 102(e) as being anticipated by Baudin et al publication no. US 2004/0033317 A1.

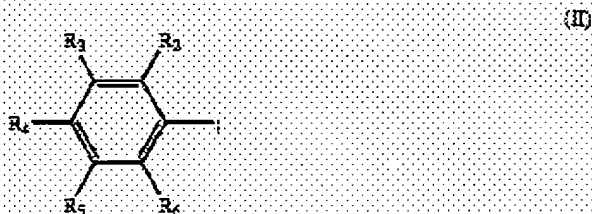
Baudin teaches a PI bound to a surface active radical such as the benzophenone PI (Ia) below. Surface acting agents such as the silicon group (III), shown below, are also called surfactants.

[0014] the formulation comprises as photoinitiator (B) at least one surface-active photoinitiator, concentrated at the surface of the formulation, of formula Ia, Ib, Ic or Id:

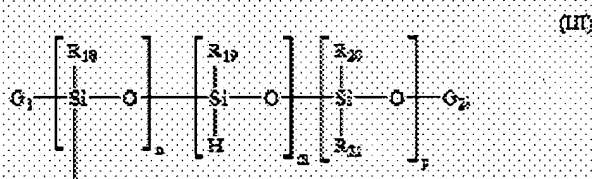


Art Unit: 1752

[0015] wherein

[0016] R and R₁ are each independently of the other a radical of formula II

[0017] wherein in formula II

[0018] R₂, R₃, R₄, R₅ and R₆ are each independently of the others hydrogen; A-X—, A₂-X₂—; C₂-C₁₂alkyl unsubstituted or substituted by OH,[0034] A and A₂ are each independently of the other a surface-active radical of formula III

Claim Rejections - 35 USC § 103

7 The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1752

8. Claims 12,13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chabreck et al. cited above in view of Mueller et al. patent no. 5,106,720.

As shown above Chabreck et al teaches the photoinitiators may be used in photoresist compositions, however, it does not teach the additives used in a photoresist composition or the patterning method.

Mueller teaches a negative photoresist composition comprising an alkali soluble hydroxylated polyamide and/or polyimide binder material, a photopolymerizable compound containing at least two ethylenically-unsaturated double bonds, and a light-sensitive photoinitiator (abstract).

The photoinitiator generates free radicals and they are listed in col. 6, lines 65-68 and col. 7, lines 1-25.

The resist composition may contain additives such as dyes or plasticizers (col. 7, lines 34-38).

The method of patterning in claim 13 is shown in example 1.

While Chabreck teaches the photoinitiators may be used in a photoresist composition it does not provide any information on the composition of the resist.

It would have been obvious to one of ordinary skill in the art to use the photoinitiators taught in Chabreck for the photoinitiators in the photoresist composition of Mueller with a reasonable expectation of obtaining a base developable, thermally

Art Unit: 1752

stable, high pattern resolution photoresist composition because the photoinitiators of Chabreck generate free radicals as do the photoinitiators of Mueller.

9. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chabreck and Mueller as applied to claim 13 above, and further in view of Fey et al. publication no. US 2003/0188886 and Takaba et al. patent no. 4,179,800.

Neither Chabreck nor Mueller teach using the method of claim 13 to make a printed wiring board.

Fey teaches a negative photoresist composition comprising an ethylenically-unsaturated compound is used to make printed wiring boards (PWB). Section 49 is shown below:

FIG. 3 shows a solder mask 42 applied over some but not all of the circuit traces 40 on the top and bottom surfaces of the PWB. The selection as to which traces are to be covered and which are not to be covered is within the discretion of the circuit board designer. Typically, the solder mask is used to encapsulate all surfaces of the panel on which the commoning layer is not desired. A preferred solder mask is an organic high molecular weight resist layer. The layer is an acid resistant, negative photoresist, such as a photopolymerizable compound having an ethylenically unsaturated terminal bond, including compounds such as acrylic esters and methacrylic esters of polyhydric alcohols. If a universal plate is desired, the solder mask step is omitted.

Art Unit: 1752

One of the conventional methods of making a printed circuit boards is shown in Takaba includes the method in claim 13 in making the board. Col. 3, lines 67,68 and col. 4, lines 1-28 of Takaba are shown below.

Referring now to FIGS. 3 and 4, a conventional method of manufacturing a printed wiring board will be described in order to facilitate an understanding of the present invention. In the example being illustrated, the printed wiring board does not comprise the metal core 11 but a solid insulator substrate 12.

Furthermore, each through-hole does not have the outwardly flaring surfaces 16 and 17. At any rate, the principal surfaces of the substrate 12 and the inwardly directed surface of each through-hole are metallized to provide as best shown in FIGS. 3A and 4A a metallized layer 22. As schematically depicted in FIGS. 3B and 4B, a photoresist film 31 is applied to each principal surface to cover the through-holes. The photoresist film 31 is exposed to light through a mask (not shown) having a predetermined mask pattern and subsequently developed to expose as shown in FIGS. 3C and 4C a desired area of the metallized layer 22. The inwardly directed surface of each through-hole is thereby also exposed. After the exposed area of the metallized layer 22 is pretreated in a usual manner, an electrically conductive layer 23 is deposited on the pretreated metallized layer area as shown in FIGS. 3D and 4D. The deposition is preferably carried out by copper electroplating of the board depicted in FIGS. 3C and 4C. After removal of the remaining photoresist film portion by a known agent therefor and subsequent quick etch of the thereby exposed metallized layer portion, a conventional printed wiring board comprising an electrically conductive pattern 21 is obtained as shown in FIGS. 3E and 4E.

Claim Objections

10. Claim 13 is objected to because of the following informalities: Claim 13 does not end in a period. Appropriate correction is required.

Allowable Subject Matter

11. Claims 6,7,10,11,15,16 are *objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter: The prior art does not anticipate or render obvious a polymer or a photoresist composition comprising the imidazole dimer in these claims.

Conclusion

13. Udagawa teaches the compound 2,4,5-triarylimidazole dimer such as the compounds taught in cols. 5-6, however, the phenyl groups do not meet the claim limitation of having a reactive group that is at least one of R.sub.13, R.sub.14 or R.sub.15 is a reactive group that undergoes an addition or a condensation reaction with a reactive group of the carrier component to join the carrier component to the imidazole dimer, and R.sub.15 also may be a halogen.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rosemary E. Ashton whose telephone number is 571-272-1326. The examiner can normally be reached on Mon-Fri, 11:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1752

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Rosemary E. Ashton
Primary Examiner
Art Unit 1752

June 3, 2005

**ROSEMARY ASHTON
PRIMARY EXAMINER**